FIRST APPLICATIONS OF AN ELECTRONIC COMPUTER TO PUBLIC HEALTH ADMINISTRATION

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Appointment lists for clinics and family doctor sessions being printed on the high speed printer.

CONTENTS

INTRODUCTION

Although a number of publications[1] exist which describe the application of computers to medical science, I am not aware that any, apart from my own original paper[2], has been written on the use of computers in public health administration.

This thesis is an account of the first successful application of electronic computer management to the work of a large public health department. Details are given of the successful operation of a system which, by eliminating almost the entire routine clerical element in a current scheme of vaccination and immunisation, is labour-saving for family doctors and the health department. The system is economically sound and has resulted in more children being properly protected against more preventible diseases.

The application of this new instrument of management to other areas of the work of the department is outlined.

The future effect of electronic data processing and medical record keeping is briefly discussed in the light of the researches described.

It is concluded that automation represents a significant advance in the techniques of health services administration and that, by its skilled application, measurable improvements in the public health may be anticipated with confidence.

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1. See bibliography p. 50
2. GALLOWAY, T. McL. Management of Vaccination and Immunisation Procedures by Electronic Computer, Med. Offr., 1963, 109, 232-233.

The Studies and Analysis

The prevention of preventible disease is and has always been one of the main concerns of the Medical Officer of Health.

Section 26 of the National Health Service Act, 1946 states:-

(1) Every local health authority shall make arrangements with medical practitioners for the vaccination of persons in the area of the authority against smallpox, and the immunisation of such persons against diphtheria.

(2) Any local health authority may with the approval of the Minister, and if directed by the Minister shall, make similar arrangements for vaccination or immunisation against any other disease.

(3) In making arrangements under this section a local health authority shall give every medical practitioner providing general medical services in their area under Part IV of this Act an opportunity to provide services under this section.

(4) The Minister may, either directly or by entering into arrangements with such persons as he thinks fit, supply free of charge to local health authorities and medical practitioners providing services under this section, vaccines, sera or other preparations for vaccinating or immunising persons against any disease.

(5) The Vaccination Acts, 1867 to 1907, shall cease to have effect.

When this Act became law in July, 1948, vaccination against smallpox and immunisation against diphtheria were the two preventive processes with which health departments were concerned. Since that time, effective antigens against tetanus, whooping cough, poliomyelitis and tuberculosis have been made available for use in schemes for the protection of children. General medical practitioners and public health medical officers carry out the procedures according to programmes

which are approved by the Ministry of Health - programmes which were once completed in the first few weeks of life but which now extend over a period of several years.

The programmes are complicated by the parents' right to have children dealt with by family doctors or at health department clinics. Difficulties of management arise over the supply of biologicals and equipment, and record keeping, particularly in County administrations with many remote clinics. The identification of children who may be due for a preventive procedure, making appointments for them and dealing with non-attenders in an effective way is beyond all but the best organised and most diligent family doctor.

His difficulties are aggravated by his need to provide the local health authority with records of vaccinations and immunisations done, in order to receive a fee which is payable for records of certain single procedures and in other cases for a record of multiple procedures (Appendix 1).

As additional antigens have been approved, health departments have generally attempted to solve the additional administrative work by the introduction of additional forms. The results of all this are better imagined than described but the confusion must have contributed to some considerable extent to the generally disappointing indices which are made known by the Ministry of Health each year (Appendix 2).

In an article[3] I described a successful attempt to produce a form which would serve as a record of all immunisations and vaccinations and

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3. GALLOWAY, T. McL. A Record and "Claim" Card for Vaccination and Immunisation Procedures. Med. Offr., 1960, 104, 263-264 (see also Appendix 3).

also as a general practitioner's "claim for payment" document. This simplification was welcomed in place of a considerable number of other forms but it did little, of itself, to produce better indices.

It was obvious that, unless some method of making appointment lists - particularly for family doctors - could be devised, further improvement was unlikely. Everything else had been made as straightforward as possible. Antigens were sent on demand accompanied by the correct number of sterile disposable syringes with needles attached, payments for records were made without delay, health visitors followed up known defaulters and brought them to doctors' surgeries, but it was realised that not all children due for procedures were invited or submitted at the right time. Parents were, of course, given personal records of the children's progress but it is only the very exceptional parent who will have diligent regard to this and seek appointments when they become due.

Some way had to be found to eliminate the human element in appointment-making, some way to release doctors, doctors' wives, and clerks from the monthly task of searching through thousands of records to discover which children were due for some immunisation or vaccination and what that procedure was. This laborious, complicated, but essentially repetitive process was being carried out in two hundred doctors' surgeries and in the offices of the County Health Department every month. A time-consuming, fallible, and not obviously rewarding chore for the searcher.

In October, 1960 the County Council decided to acquire an IBM 1401 data processing system (Appendix 4). It seemed at least possible that, if this machine could do involved payroll calculations for nearly ten thousand employees, it might do a similar monthly task in connection with vaccination and immunisation work for nearly one hundred thousand children.

I was aware that computing machinery had gone beyond the stage of doing complicated calculations and that in industry it was being used to control processes which, hitherto, had depended on human judgment and decision. It was clear that, while this process of automation did not do away with the need for skilled planning and oversight, it extended the controller's ability to deal effectively with large numbers of interacting factors in making many near-simultaneous decisions.

It was likely to replace the need for an accurate memory and seemed to offer a prospect of accuracy which could not be expected even of experienced and well-trained clerks. Not least, the possibility of doing away with traditional records, with a consequent saving in space, seemed worth while.

In short, if this machine, or something like it, could be instructed to carry out serial processes on large numbers of industrial products, it should be capable of producing repetitively month by month the required information which was being produced in the traditional way.

As a first step towards automating the existing clerical procedures, it was necessary to analyse those procedures and reduce them to a list of choices in sequence. The factors which affected or conditioned the choices in practice had to be carefully identified.

This was an essential preliminary to discussion with the computer staff as to the possibility of automating the processes.

During this time it was necessary to develop a working knowledge of the computer's capability and limitations, and it was equally necessary for the computer staff to acquire some idea of the technical requirements and procedures in the Health Department.

Development of a Programme

Information and instructions can only be assimilated by the computer from punched cards, and once the procedures and data patterns had been analysed and agreed in detail, they had to be coded and punched so that the machinery could process the data and produce the end products in a useful form.

This process of producing a series of machine programmes for this purpose had not, and still has not, been done anywhere else in the world and it took several months to complete, since this work had only a certain degree of priority in the scheme of initiating the computer into the County management.

Some detail of the existing programme is given in Appendix 5.

When it seemed likely that the trials would succeed, I made my intentions known to the Health Committee of the County Council, the

Executive Council, the local branch of the British Medical Association and to the Local Medical Committee.

In doing so, I made it clear that it would be necessary, initially at least, for doctors to agree that one of the programmes of vaccination and immunisation which had been recommended by the Ministry of Health would be the accepted schedule for the County. This was agreed and Schedule P (Ministry of Health Circular 26/61) (Appendix 1) was selected.

The co-operation of the family doctors was readily forthcoming, as professional relationships with the County Health Department are cordial and effective, largely as a result of other useful services to general practitioners recently provided or improved by the West Sussex County Council. The likely effect of computer management of relieving general practitioners of the entire clerical and administrative element of this complicated area of family practice was of course an exceedingly attractive and welcome prospect.

DEMONSTRATIONS OF SUCCESSFUL WORKING

The computer was installed in October, 1962 and two months later (December, 1962) the first immunisation and vaccination clinic, which had been entirely planned and documented by the computer, took place at Chichester. This initial success has been repeated many times, both for family doctors and local health authority immunisation sessions.

In order to do this, the computer is given the following information - initially on punch cards - which is stored by the machine on

magnetic tape:-

(i) the name, address and date of birth of the patient (from the immunisation consent/refusal form, Appendix 6). This form is completed by the health visitor for every birth notified. Lists of children whose parents had not consented to their being vaccinated and immunised were to have been printed each month by the computer, by health visitor, so that appropriate follow-up visits, in concert with the family doctor, might be arranged so that as many refusals as possible would become consents. In fact, refusals have been very few - actually 7 in the last two years during which over 12,000 births have been notified. A "consenting" patient is immediately admitted by the machine to the programme of vaccination and immunisation;

(ii) details of the family doctor or clinic times, depending on the patient's choice of service source. In order to make appointments, the machine must store information about the days and times which the general practitioners have set aside for this work and, for patients who have chosen the local health authority as the source of service, the days and times of the vaccination and immunisation clinics in the many locations throughout the County. Family doctors, who quickly recognised the benefits implicit in the new scheme, were invited to allocate a given time each month for vaccination and immunisation appointments, e.g. the third Thursday of

every month at 2 p.m. This standing arrangement - which can be varied but normally remains fixed for each doctor or group practice - eliminates the need for monthly enquiry, and permits the allocation of appointments for patients in a sequence convenient for both doctor and patients. As a result of experience, appointments are made at the rate of 28 every 15 minutes. This rapid rate is made possible by the simplicity of the system;

(iii) the currently accepted scheme of vaccination and immunisation procedures - schedule P attached to Ministry of Health Circular 26/61 (Appendix 1); and

(iv) the identity etc. of patients moving in or out of the County and between doctors. This information comes from health visitors, school rolls, family doctors and, by arrangement, from the Executive Council.

At each monthly run the computer produces

(a) for each participating doctor, or group, or County authority clinic, a list of patients due to attend, the exact procedure due and the time of appointment given. This list may be used to prepare and despatch to the doctor or clinic an appropriate pack of antigens, sterile disposable syringes etc. in time for the appointed day. Examples of this "schedule of appointments" are given in Appendix 8; and

(b) a stamped, addressed invitation to each patient due for a procedure giving details of the day, time and place of the

appointment. Examples are shown in Appendix 7.

The list of patients due for a procedure which is sent to the family doctor is used by him during his immunisation clinic as a record of work done, and results obtained, by ticking appropriately in one of the columns numbered 6. The batch number of the antigen is noted in column 7. This is usually easy, as the patients for different procedures or groups of procedures are given sequential appointments and the batch number is only written once. The results of smallpox vaccination are reported by ringing the conventional code letters A to D in column 8.

This list, signed by the doctor, is returned to the County Health Department where it is checked for any notes by the doctor, on which departmental action may be required (example Appendix 9). It is then turned into a punch card record by means of which the computer up-dates the master tape record, calculates the doctors' fees due, and draws cheques to be sent to the doctors. The doctors' freedom to give non-scheduled vaccinations and immunisations is preserved. Supplies of a form of return are made available to the family doctors so that they may list the identities of patients, and procedures given, without a computer-arranged appointment having been made.

This monthly return is coded for the computer in similar fashion to the returned schedule of appointments so that the updated master tape will have all the records of vaccinations and immunisations given, whether by appointment or not.

Increasingly, however, the doctors are relying on the computer management, and unscheduled appointments are few and decreasing.

Performance statistics and the calculation of age group protection indices as required by the Ministry of Health are produced simultaneously, and from the tape a list may be produced each month giving the identities of patients who have failed to attend without excuse on three occasions. Health visitors may visit those failures to persuade them to come, or even to bring them for the outstanding procedure at the time of the next invitation.

The entire County is not yet "covered" but the proportion of clinics and general practitioners whose vaccination and immunisation functions are computer managed is growing steadily and is currently 20 of 22 County clinics and 153 of 185 general practitioners.

More traditional records are assimilated each month and it is hoped that the entire operation will be computer managed by October, 1965. Until that time the old and new systems will continue concurrently* although a progressively larger proportion of the work is being computer managed every month.

A more rapid changeover to the new system is limited by the availability of punch card operators for this work and by the variable quality and accuracy of the general practitioner records called in for conversion. The old records cannot be called in until they can be "converted" without delay, or current programmes being conducted by the doctors would be interrupted.

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* the old or manual system is now being operated only in the Borough of Worthing and the north-eastern part of the County. The Borough of Worthing has delegated powers to operate Section 26 of the National Health Service Act, 1946 and has not yet agreed to participate in the scheme of computer management.

Although improvements in terms of percentage of children fully protected are already demonstrable - the proportion of children under 15 fully protected against diphtheria has risen from 51.3 per cent in 1962 to 55.6 per cent in 1963 and 61.2 per cent in 1964, and the improvement in the indices of protection against the other diseases is of a similar order - it is reasonable to expect that by the elimination of the human element in sorting records and making appointments, by the systematic identification and follow-up of parents who fail to consent and of patients who default, there will be even better results in the future when the whole County operation is automated. More children will therefore be properly protected against more communicable diseases.

Success has already been gained in other important ways:-

(i) Family doctors, their wives or secretaries have been relieved of the monthly search of records and the time-consuming and costly business of summoning patients due for preventive procedures. As a contribution to a better relationship and more effective working together of health department and general practitioner, this should not be under-estimated;

(ii) there is a corresponding economy in clerical effort in the health department, Staff can be turned to less repetitious and more useful work or their posts can be declared redundant as resignations and retirements occur. It is in any case becoming progressively more difficult to recruit and keep staff who will deal conscientiously with a recurring chore which can be done more accurately by machinery;

(iii) records are now kept on magnetic tape and the entire vaccination and immunisation intelligence on nearly 100,000 children will occupy a volume of only two cubic feet. Many hundredweights of card records occupying considerable storage space have been discarded from the health department;

(iv) a similar advantage has been gained by the family doctors who have been assured that individual records which may be required, e.g. in cases of suspected tetanus risk, can be made available very quickly. A computer operator will be available at any time of the day or night* to make a print-out of the record of any patient whose particulars are on the magnetic tape record. Taking into account the very variable quality of general practitioner records, it is likely that this central availability will be more accurate and as quick as a dispersed record system.

Recent developments in computer machinery will reduce the time taken to identify and print out any wanted record from the time taken now (up to 18 minutes) to about 90 seconds. There is in any case no urgency of this order in making a decision as to whether a casualty should receive anti-tetanus serum, tetanus toxoid or both - the main consideration is that the information should be available and accurate; and

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* until the system extends to the whole County, a monthly print-out of the complete magnetic tape record is supplied to the vaccination and immunisation section of the department.

(v) the ability to identify more readily those who have received protection which is still operative; this will also be useful should an outbreak of communicable disease, such as smallpox or diphtheria, occur.

It is not possible to make useful cost comparisons between the previous arrangements and the new. The previous arrangements provided a very limited service for general practitioners which was restricted to a payment for acceptable records submitted. It is impossible to put a cash value on converting an imprecise system into a fool-proof one, or to place a cost figure on the relief from clerical and administrative chores which has been brought to some 200 general practitioners. More money will have to be paid to the family doctors because more vaccination and immunisation is being done. The concurrence of the manual and computer systems contains an element of expense which will disappear when the whole operation is mechanised. There is, too, always a concentration of cost in "taking on" a new task deriving from the need to code, punch and tape thousands of existing records.

All things considered, it seems reasonable to expect, on the basis of evidence so far accumulated, that a very much better result will be achieved with far less effort for a moderate increase in expenditure. This increased cost, like that of improving any other public service, has been provided for by the County Council.

APPLICATIONS OF THE COMPUTER TO OTHER PUBLIC HEALTH DEPARTMENT FUNCTIONS

The possibility of a useful computer application has been suspected in any departmental functions where large volumes of information are obtained in numerical or other form which permits codification. Much of the work of a large public health department is concerned with the gathering of information, its analysis, and its translation into material which will have significance, to some extent simply because it is a great deal of information derived from the experience of large populations and the delivery of great numbers of services.

The collection, processing and preparation of this statistical and other information is almost invariably repetitious, e.g., for annual reports and quarterly returns; the processes are time-consuming and often depend for their accuracy on feats of memory and conscientiousness on the part of clerical staffs - many of them young women among whom there is a considerable labour turnover.

The apparently insatiable appetite of committees and ministries for information of all kinds has led to the elaboration of record keeping to the point where relatively little residual energy is available for the examination of all the information which is so painstakingly assembled. Often, the delays, which are inseparable from the reconciliation of such masses of information, render the information end product valueless apart from its historical interest.

The ability of the computer to process large volumes of codified information is now being used in place of the traditional clerical methods of the past. This change was preceded by a careful study of what information was likely to be really useful, the redrafting and designing of forms of return, and the elimination of as much error risk as was possible. The need to be able to convey this information quickly - sometimes automatically - to the processing machinery was also kept in mind with the result that a number of typical public health department clerical tasks have been simplified, speeded up and, by the elimination of clerical error, given a degree of accuracy which was formerly unattainable.

Statistical and other reports can be produced while they are of relevant rather than historical interest and the data can be processed so as to produce only those results which are either required or are likely to be of interest and value in making decisions.

An example of this technique is provided from the ambulance (and hospital car) work of the department. In place of the usual journey sheets completed by drivers of other authorities, the drivers in this County complete a mark-sense card (Appendix 10) on which journey/passenger details are recorded by marking the appropriate coded locations on the card. These cards (on which the computer makes its own related punchings) are fed, as they are, directly to the card input of the computer and detailed statistics, with whatever correlations may be required, are produced at once (Appendix 10).

Appendix 12 is an example of a weekly return completed by each dental officer. This information is prepared during the working week by the dental attendant at the same time as she makes the record of work done on the dental charts of individual school children, pre-school children and expectant women. This information is needed not only for Ministry returns but is useful, for example, in checking the techniques and output of work of individual dental surgeons. The processing of all this mass of detailed information is now performed by the computer.

Similarly, Appendix 13 shows specimens of standard work returns on which the information about health visiting, nursing and midwifery services is based. The processing of these work sheets - in West Sussex alone some 200 per month - is now dealt with by the computer so as to produce the information which is needed quarterly for the responsible committee and annually for the Ministry of Health.

A final example is provided by a risk register which is kept in respect of children whose ante-natal or intra-natal experience, or post-natal condition, suggests that a special record should be kept with a view to their future surveillance. An example of the risk register card is shown at Appendix 11. It will be seen that the code numbers of the several headings are those of the international classification of diseases.

Analyses of experience records of this kind are generally difficult to make, particularly where multiple etiologies and experiences may be involved. It sometimes happens, for example, that a mother may have

toxaemia of pregnancy, that she will experience threatened abortion, that her labour may be complicated or prolonged, and that the child will be anoxic at birth. The use of the computer, and the extremely rapid analyses and correlations of which it is capable, will make this kind of medical intelligence more useful in the future than it has been in the past.

FUTURE POSSIBILITIES AND PLANS

The almost unbelievable ability of the apparatus to store information, and the accuracy and speed with which it can be processed, suggest that one of its most useful roles will derive from large aggregations of records and experiences.

> "The busiest and ablest obstetrician will not deliver more than 400 babies a year. Because of the low level of incidence of abnormality he may for example have met only two such cases last year and three this year. The difference will not appear to him significant; a few is what he expects, and a few he has experienced, and that's that. The fact that thalidomide has produced a 20 per cent or more increase, simply cannot be deduced from his experience alone. Yet, if even a quarter of the U. K. births were recorded electronically, then a 20 per cent increase in abnormality would be apparent in a week or so. What is true of the busiest and ablest obstetrician is obviously even truer of the less able and less busy. In fact, it is true of any clinician with respect to those conditions he meets infrequently, and which may be outside his own speciality. The doctor-patient relationship may be sacrosant, but it is worth reminding ourselves of the limited reference set of knowledge and experience which serve it. And this is nobody's special fault; it is simply due to the growing fund of medical knowledge. Refinements in medicine are obviously possible if something approximating to the aggregate knowledge and experience can be focussed on a problem - and this is what the vast storage capacity and incredible speed of the computer make possible". [4]

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4. PAYNE, L. C. Medical Automation, Radar and Electronics, March 1964, 9-11.

Since the computer system for vaccination and immunisation described is unique in that this County Health Department has a return relating to all vaccinations and immunisations, it is likely that a small number of unusual experiences by a small number of doctors would be more noticeable than under any other system.

Another possible application of the computer which is presently under examination concerns the allocation and planning of journeys by the ambulance and hospital car service. (The councils of counties and of county boroughs administer these services in England and Wales). Approximately 95 per cent of ambulance and hospital car journeys are non-emergencies and the requirements, and resources available to meet those requirements, are known well in advance of the time when the journeys must be made.

The computer is capable, having been given requirement and resources details, of producing daily journey sheets, including patients' names and addresses, departure locations and destinations, with times, and the identity of vehicles, drivers and attendants for every vehicle which should be used. The computer will have regard to the need to reserve a proportion of the resources for emergencies, shift working, and any other factors which can be known in advance and should be taken into consideration.

One of the most attractive prospects must be the improvement of medical record systems, The third generation computers will provide accessories for giving information to the computer, and receiving

information from it, at places quite remote from the computer. Medical records may be built up from suitably codified information from hospitals, family doctors, health departments, industrial health organisations etc., and could be made immediately available for statistical and research purposes and more importantly for any doctor who had the care of the patient wherever he may be as long as he has access to a remote input/output unit. With the growing rate of family migration in this country, the need to devise means to overcome the frequent absence of medical records becomes more important. It is entirely possible, before many years have elapsed, that a house physician in Edinburgh may receive a print-out of a patient's record, with a cathode-ray display of his X-rays, which are stored on magnetic tape in Chichester - within minutes of making a general enquiry linked, say, to the patient's national health service registration number allocated at birth.

More pedestrian applications of the machinery relate to everyday problems of stock issue and control. It is likely that the recording of issues of home nursing equipment and welfare foods will be administered by the computer before long.

Experiments are now being conducted into the possibility of using the main vaccination and immunisation tape record to programme periodic school medical inspections. Coupled with these experiments

is the intention to include significant findings of periodic medical inspections on the child's magnetic tape record. This opens up the attractive possibility of greatly reducing or eliminating a very large amount of clerical work involved in programming, recording and analysing periodic medical inspections in schools.

CONCLUSIONS

Enough has been said to display some of the many existing and possible applications of this new tool of management. The more obvious work of calculating results from accumulated data has been done by machinery for many years. What is new and proved in practice for the first time is that public health programmes, involving the application of discretion based on feats of memory, barely possible for human beings, can be managed easily, economically, flexibly, and with unprecedented accuracy by this technique.

It is submitted that this is a significant advance in medical services administration and that it heralds an era of revised and improved practice by health authorities.

In a "free" health service there are no sales and no profit and loss account by which performances may be judged. As the present service is a near monopoly, and criteria are in any case impossible to agree, comparisons, whereby assessments of the quality of performance can be made, are nearly impossible. In these circumstances, indifferent management and ineffective working may continue, often unnoticed or at any rate unchanged, for years.

Most of the discussion about the need for improved management centres on the administrative organisation of the National Health Service and the many ways in which it might advantageously be recast. Much of this discussion is vitiated by the fact that it concerns the usually immeasurable products of a social service. Some of the products are, however, accurately known and this thesis is a demonstration of the practicability of improving the service provided by a modern health administration, using a modern aid to health service management.

The techniques described here will certainly be refined and improved in the years to come as the application of computers to medical science and administration is a recent development. Methods whereby written records may be translated automatically to magnetic tape, eliminating the intermediate stage of punch carding, have already been used.[5] Apparatus making this possible is only available as yet on a very limited scale, but in time it will be applied, and will further simplify and improve, the processes with which this thesis has been concerned.

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5. COSMA, J., VOLK, M., GREENOUGH, M. L., and PIPBERGER, H. V. Automatic Method for Processing Mass Data in Clinical Medicine (FOSDIC). Method Inf. Med., 1963, 2, 125-129.

It is certain that service improvements such as those described in this study will contribute materially to making "community care" a reality. One of the most significant functions of health departments must be to support and facilitate the work of the family doctors, particularly if they are to be expected to play any worthwhile preventive, as well as a therapeutic, role in medical care.

Neither family doctors nor the Executive Councils have the resources to provide the imaginative, generous, and skilfully administered supporting services which are required.

It will be for the larger health authorities to meet this need as part of their contribution to the public health.

APPENDIX 1

Schedule of Preventive Vaccinations and Immunisations

The discovery of additional effective antigens made the need for accepted programmes of inoculation essential.

The most commonly used programmes are derived from those first approved at a Symposium on Immunisation in Childhood held in London in May, 1959.

The Ministry of Health adopted the recommended "schedules" and advocated their general use in Circular 26/61 dated September 12th, 1961. They have been revised from time to time, most recently by Circular 11/64 dated July 9th, 1964.

Schedule P was adopted by the County Council and the Local Medical Committee for use in West Sussex and is currently as follows:-

Age of patient ø (approximately)	Antigen	Procedure number
2/12	Triple	1
3/12	Triple	2
4/12	*Triple	3
6/12	Polio	1
7/12	Polio	2
8/12	*Polio	3
1 - 2 years	*Smallpox	1
15/12	*Triple	4
5 years	*Polio	4
5 years	*Diph/Tetanus	5
8 years	*Diph/Tetanus	6
9 years	*Smallpox	2
13 years	B.C.G. at school	

ø The ages shown here are those followed by the computer.

In addition, on the computer programme, children who have not received a fourth triple inoculation and who are over three years and under four years of age are offered a fourth diphtheria/tetanus inoculation instead.

Children under the age of eight years who have only received diphtheria/whooping cough protection in infancy (tetanus being a recent addition) are offered a course of three doses of diphtheria/tetanus at monthly intervals.

For all records of completed procedures (marked * above) given to children by general practitioners in accordance with this programme, a fee of five shillings is paid.

APPENDIX 2

Current Indices of Protection Against Infectious Disease

Smallpox Vaccination

Recent figures for smallpox vaccination were affected by the outbreaks of smallpox in 1962 and the advice from the Ministry of Health (Circular 27/62) later that year, that primary vaccination should be offered during the second year of life and not as hitherto at 4 - 5 months of age.

> "The balance of authoritative opinion as expressed in the Joint Committee on Vaccination and Immunisation and in its Sub-Committee on smallpox is in favour of routine vaccination in the second year of life,"[1]

but only about half of the children born in England and Wales are vaccinated during the first two years of life. The actual figures for 1958, 1959 and 1960 were 48.5%, 50.2% and 48.6% respectively.

Vaccination against Poliomyelitis

There is still sufficient public concern about poliomyelitis to ensure the success of the vaccination campaign to control it. The incidence of poliomyelitis infection in 1963 was the lowest ever recorded in England and Wales, and is the culmination of a trend which began with mass vaccination against the disease.

In answer to a question in Parliament on October 24th, 1963, the then Minister of Health stated that 83 per cent of persons in England and Wales under 20 years of age on 31st December, 1962 had been immunised against poliomyelitis.

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1. G.B. MINISTRY OF HEALTH. On the State of the Public Health. The Annual Report of the Chief Medical Officer of the Ministry of Health for the year 1962. London: H.M.S.O., 1963.

Vaccination against Whooping Cough

After remarking that the number of notifications of whooping cough rose from 8,347 in 1962 to 34,736 in 1963 and that the deaths had gone up from 24 to 36, the Chief Medical Officer of the Ministry of Health stated

> "The position is not entirely satisfactory for the available vaccines should give a large measure of protection."[1]

Immunisation against Diphtheria

Notified cases of diphtheria in England and Wales more than doubled in 1963 compared with 1962. The percentage of children who had completed a course of primary immunisation or received a reinforcing injection within five years, i.e. those "protected" against diphtheria, was 57% of children under 15 years of age. In spite of an increased number of births in 1962, over 200,000 fewer children were immunised against diphtheria in 1962 than in 1961.

It is clear from the above that in spite of preventive measures being freely available, without cost, the population of England and Wales are insufficiently protected against preventible diseases.

This regrettable, and often tragic, state of affairs is primarily the expression of a management problem - the difficulty of carrying through the programme of vaccination and immunisation for children whose parents have asked for this comprehensive protection to be given.

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1. G.B. MINISTRY OF HEALTH. On the State of the Public Health. The Annual Report of the Chief Medical Officer of the Ministry of Health for the year 1962. London: H.M.S.O., 1963.

APPENDIX 3

A Record and "Claim" Card for Vaccination and Immunisation Procedures*

By T. McL. GALLOWAY, M.B., F.R.C.P.E., D.P.H., Dr.P.H.
County Medical Officer of Health, West Sussex

"TRIPLE" vaccine has recently been approved for use in this authority's scheme and it seemed likely that this would add further to the existing confusion of records and claim forms then in use.

The new scheme which has now been introduced has been simplified in that only three record cards will be used. They will replace eight previously in use, and it is hoped that the patient, the doctor, and the health department will be better informed as a result.

(1) Every patient will be given a personal record card. The Burroughs Wellcome one, which carries the second schedule of the 1959 Symposium on Immunisation in Childhood, will be used. The manufacturers provide these without charge, and entries are made by the family or clinic doctor, so that the patient (or more usually the parent) knows what has been done, what remains to be done, and when the next procedure is due.

It should also be available (sometimes at any rate) in cases of accident, so that a correct decision on anti-tetanus therapy may be made.

(2) The family doctor's record card is, I think, a new development and one which I hope will be useful to others. It will

---

*Med. Offr., 1960, 104, 263-264.

WEST SUSSEX COUNTY HEALTH DEPARTMENT

SURNAME .....

CHRISTIAN NAME (S) .....

DATE OF BIRTH ..... N.H.S.No. .....

ADDRESS .....

.....

.....

.....

NAME & ADDRESS of DOCTOR

.....

.....

.....

.....

FAMILY DOCTOR'S RECORD of IMMUNISATIONS

Procedure No.	* About Age	Date given	Dose c.c.	Site of Injection	Serial No. and Name of vaccine	
1	2/12				Triple	
2	3/12				Triple	
3	4/12				Triple	
5	6/12				Polio (Oral) 1	
6	7/12				Polio (Oral) 2	
7	8/12				Polio (Oral) 3	
4	1-2yrs	(Record on facing page)			Smallpox	
8	15/12				Triple 4	
9	5 yrs				Diph & Tetanus	
10	5 yrs				Polio 4	
11	8 yrs				Diph & Tetanus	
12	9 yrs	(Record on facing page)			Smallpox	

* The ages shown here are intended as a rough guide.

	Primary Vaccination		Re-vacc Primar at a
	1st Attempt	2nd Attempt	1st Atte
Date			
Lymph Batch No.			
Date of Inspection			
RESULT	A D	A D	A B C
Ring letter which applies	A Typical Primary Vaccinia (Max 7t B Accelerated Reaction (Max 5th - 7 C Local Reaction Without Vesiculatio D No Local Reaction		
Indicate here (by X) any complication or unusual reaction.			Generali Encephal Other

FOR OFFICE USE ONLY

Account passed to County Treasurer for p

Procedure	Date Passed	Procedure
3		10
4		11
7		12
8		
9		

THIS RECORD CARD SHOULD BE KEPT WITH THE PATIENT'S MEDICAL RECORD, BY THE FAMILY PHYSICIAN.

ENTRIES SHOULD ALSO BE MADE ON THE PATIENT'S OWN IMMUNISATION RECORD, SO THAT THIS IS WITH THE FAMILY IN CASE OF ILLNESS OR INJURY.

THIS RECORD SHOULD BE SENT TO THE COUNTY MEDICAL OFFICER OF HEALTH ON EACH OCCASION LISTED BELOW. AN ACCOUNT WILL BE PASSED TO THE COUNTY TREASURER FOR THE AGREED FEE TO BE PAID AT THE END OF THE QUARTER. THE CARD WILL BE RETURNED TO THE FAMILY DOCTOR WITHOUT DELAY.

T. McL. GALLOWAY,

COUNTY MEDICAL
OFFICER of HEALTH.

THIS CARD TO BE SENT TO THE COUNTY MEDICAL OFFICER OF HEALTH ON COMPLETION OF PROCEDURES

3, 4, 7, 8, 9, 10, 11 & 12.

Form No. 2063
M.1226 (Rev 11/64)

(a) Fit into the patient's record envelope EC.5.

(b) Provide a reliable record which will be safe, even if the patient's personal record card is lost.

(c) Act as a claim form for payment on completion of the agreed procedures or groups of procedures (e.g. the first three triple inoculations make one record for which a claim may be made).

(d) Provide the necessary statistical and other information for the health department.

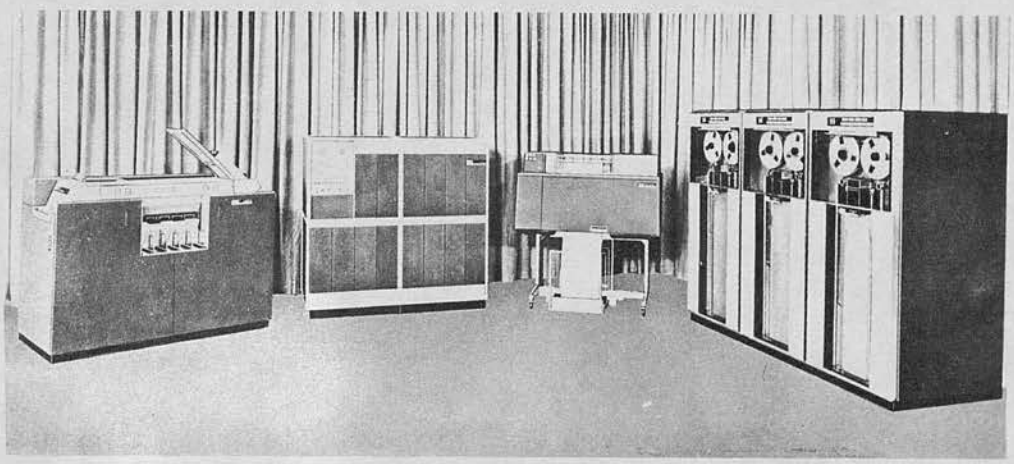
When procedure number 11 is completed, the family doctor can destroy the second page of the card, so that all of the inoculation history of the patient is on one card, which does not occupy much of the patient's record envelope.

(3) The consent form is the third form, and on this the patient's parent is encouraged to agree to diphtheria, whooping cough, tetanus, smallpox and poliomyelitis protection, with reinforcements as may be recommended to be done, either by the family doctor or at the clinic.

The simplified recording and claiming has been generally welcomed by the family doctors (it was of course submitted to the Local Medical Committee before introduction) and I shall be very pleased to send a sample of the family doctor's record and claim card to anyone who asks for one. Its contents are reproduced below.

APPENDIX 4

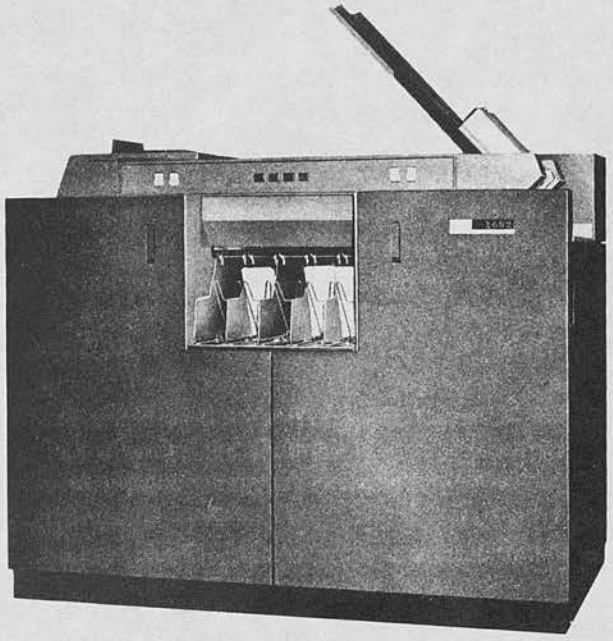
The IBM 1401 Data Processing System



IBM 1401 TAPE SYSTEM.

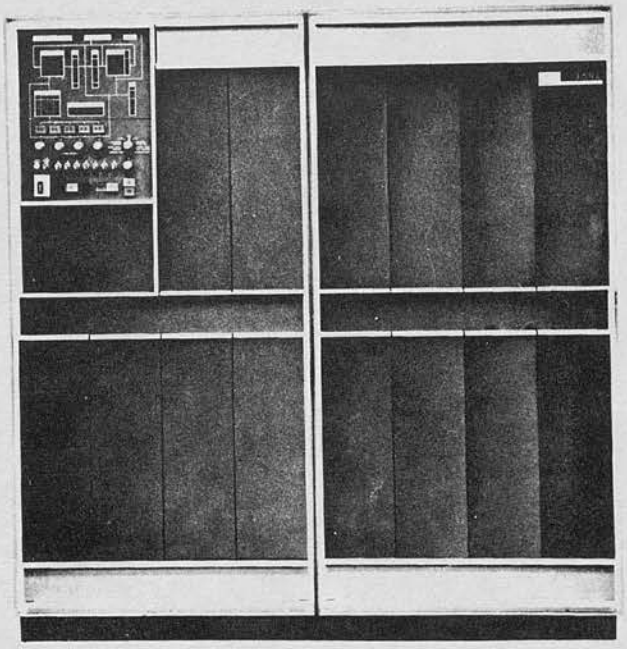
The IBM 1401 processing system, which was announced in October, 1959 and installed in West Sussex in October, 1962, is a transistorised stored-programme computer.

It consists of the following units:



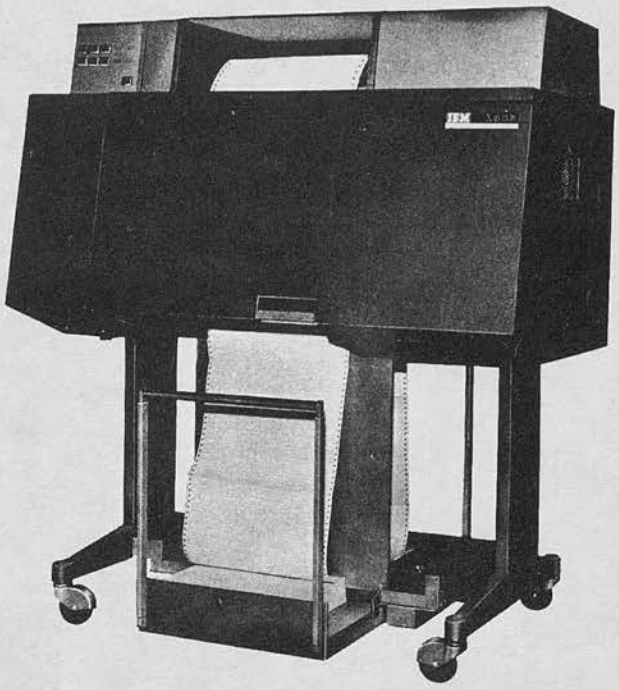
IBM 1402 Card Read-Punch

1. The IBM 1402 card read-punch which provides punched-card input and output. With the file-feed device, the read feed can be loaded with as many as 3,000 punch cards and the machine will read 800 80-column cards per minute. The punch section has a rated speed of 250 cards a minute.



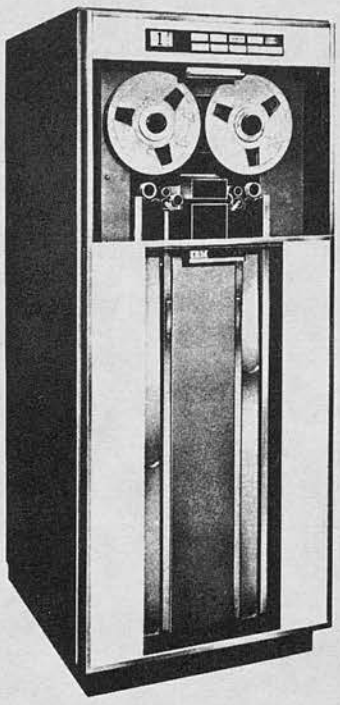
IBM 1401 Processing Unit

2. The IBM 1401 processing unit contains the magnetic-core storage unit and performs all the machine logic.



IBM 1403 Printer

3. The IBM 1403 printer is an output medium for the 1401 system - punch card output, already mentioned, is another. The printing capacity is 600 lines per minute with up to 132 character positions per line. The carriage skips at 75 inches per second, and continuous, specially designed stationery is used to exploit this very high speed output.



IBM 729 Magnetic Tape Unit

4. Three IBM 729 magnetic tape units. Information can be stored most advantageously on magnetic tape. A magnetic tape reel ($10\frac{1}{2}$" in diameter) contains 2,400 feet of tape - sufficient to record 14 million characters. They are easily stored, very durable, and portable. The information is written and read from the tape at up to 62,500 alpha-numerical characters per second so that a whole tape can be processed in about four minutes.

Detailed vaccination and immunisation records for all the children in the County will be stored on four magnetic tapes when the "take-on" process is completed. Already, the records of many thousands of children are stored in this way.

APPENDIX 5

Detail of the Computer Programme

The programme is completed in four computer "runs", the main object of each run being

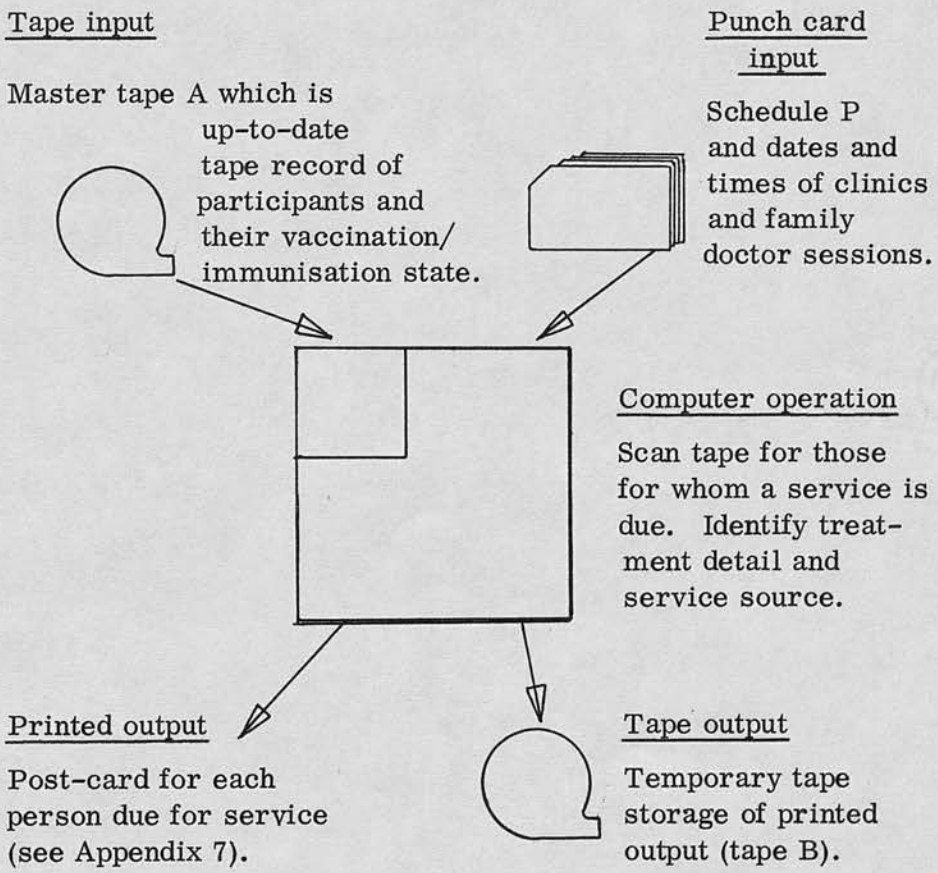
(i) the production of appointment post-cards for each person due for vaccination or immunisation;

(ii) the production of appointment schedules for each County clinic, and each family doctor or group practice session;

(iii) an analysis of the work done, and the printing of cheques for the payment of family doctors; and

(iv) the production of an updated master tape which will be the basis for the following month's sequence.

Run (i)



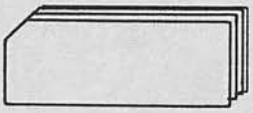
Run (ii)

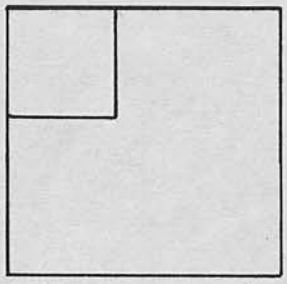
Tape input

Tape B

Punch card input

Sorting instructions





Computer operation

Treatment selected for appropriate family doctor or clinic list. Similar services grouped on each schedule. Allocation of appointment times.

Printed output

Appointment schedules for each clinic and family doctor or group practice (see Appendix 8).

Tape output

Details of appointments made (tape C).

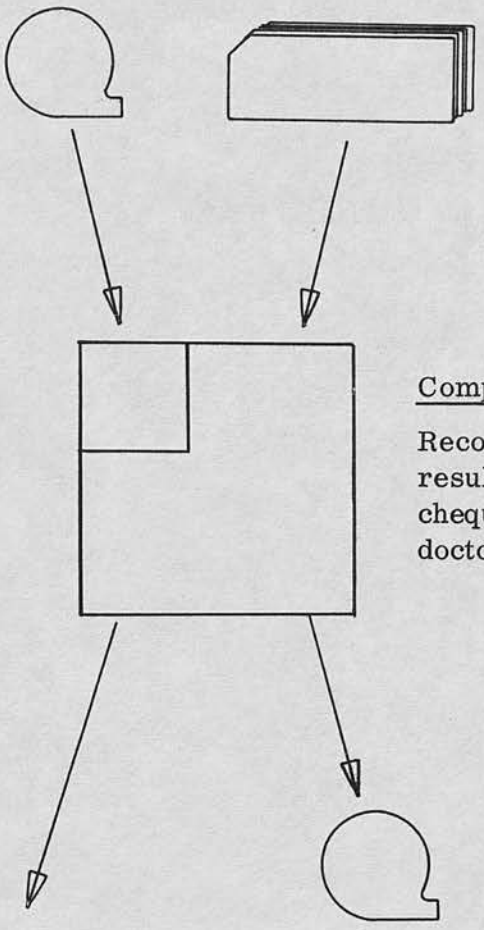
Run (iii)

Tape input

Tape C

Punch card input

Response detail from returned schedules, and "unscheduled appointments" lists.



Computer operation

Record and analyse results. Print cheques for family doctors.

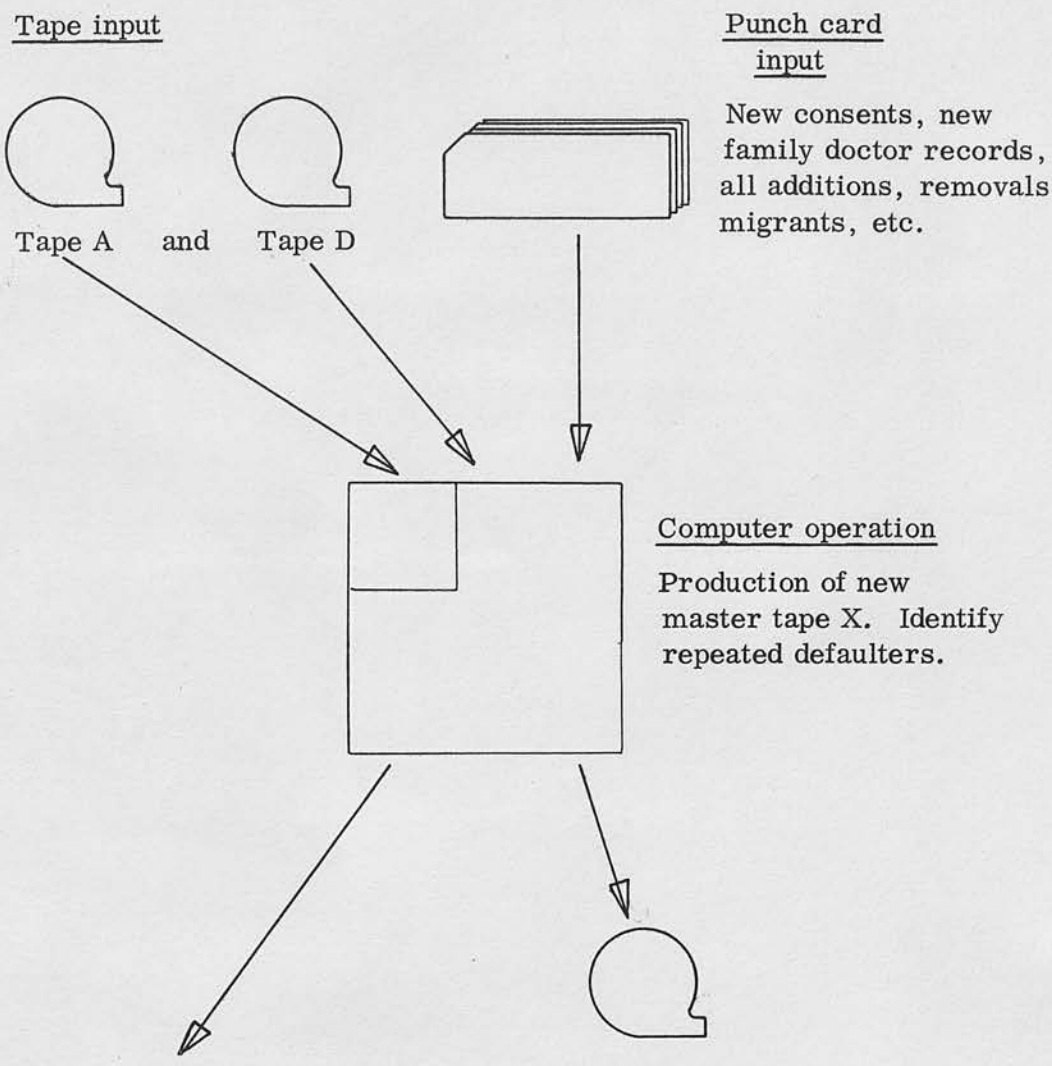
Printed output

Analysis of results and cheques for family doctors.

Tape output

Appointment response (tape D).

Run (iv)


Tape input
Punch card input
New consents, new family doctor records, all additions, removals migrants, etc.
Tape A
and
Tape D
Computer operation
Production of new master tape X. Identify repeated defaulters.
Printed output
Names and addresses of persons missing three consecutive appointments without excuse.
Tape output
Updated master tape X which becomes tape A for start of following month's sequence.

WEST SUSSEX COUNTY HEALTH DEPARTMENT

County Hall,
Chichester.

To the County Medical Officer of Health,
County Hall, Chichester, Sussex.

PROTECTION AGAINST COMMUNICABLE DISEASE

CONSENT FORM

Name of child Barry JONES Date of birth 9.10.64

Home address 20. Green Lane, Chichester

In accordance with the County Council's arrangements under the National Health Service Acts, I wish my child, named above, to receive protection at the appropriate times against diphtheria, whooping cough, tetanus, poliomyelitis, smallpox and tuberculosis. I understand that this will be done free of charge and I should like it to be carried out at:

~~*Either (a) the County Council Clinic~~
(state which)

~~*Or~~ (b) by my family doctor (give his name and address)
Dr Blank

My child is normally healthy/ *
~~suffers from~~

If your child is of school age, please give name of school

Date 1.11.64 Signature of parent F. Jones

* Delete words which do not apply

For Official Use Only								
Clinic	Link No.	District No.	School No.	Birth		Consent Code	Position	County
				Day	Month			
3-5	6-11	12-13	35-40	41	43	44	49	50
888	640000	04		9	10	1		

Form 2035 P.T.O.

REFUSAL OF CONSENT

The parents have been interviewed and advised on the desirability of having their child protected against communicable diseases, but at this stage have refused to give consent to any vaccination or immunisation being carried out.

Date _____ (Signed) _____

Health Visitor

Form 2035/A

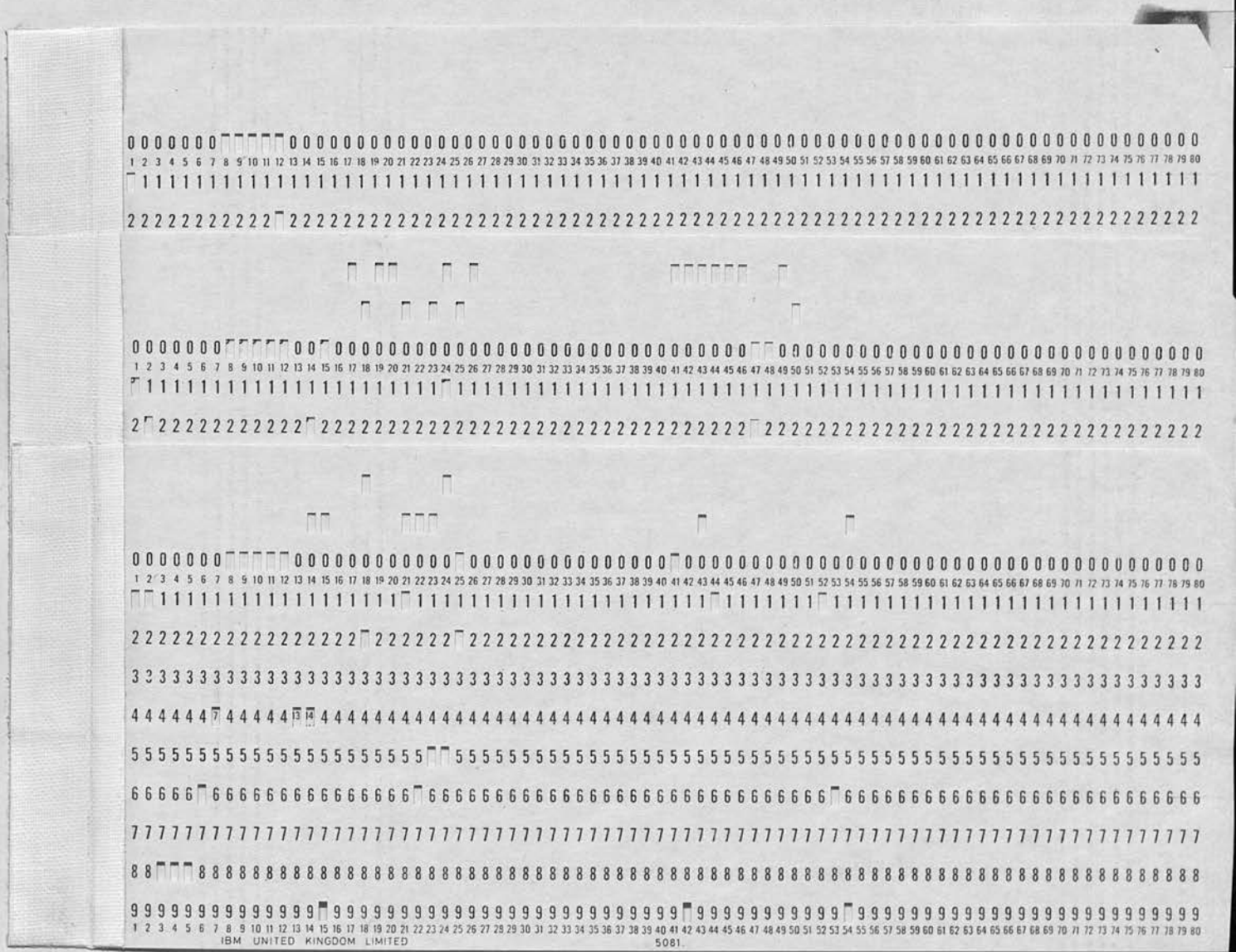
Mul.1616

APPENDIX 6

The Immunisation Consent/Refusal Form

This is a consent/refusal form which has been completed as a consent. The section at the foot of the front of the form headed "for official use only" provides codified information which will be stored on the magnetic tape record via the three punch cards. Three 80-column cards are required to enable the computer to assimilate all the information on the consent form.

The health visitor must complete the form as a "refusal" in the very few cases where parental consent cannot be secured.



APPENDIX 7

The Appointment Cards

Two appointment cards produced by the high speed printer. The first is for a child who will be dealt with by the family doctor and the second is for a child whose parents have chosen County Council clinic services.

POST CARD

05/ 7/63

Arrangements have been made for
M MUZZALL
to attend
DR BEST & WYATT

at 3.00 on 25/ 6/64
for protection against:
POLIOMYELITIS DOSE 3

PARENT OR GUARDIAN OF

M MUZZALL

16C NORFOLK RD

LITTLEHAMPTON

SUSSEX

POST CARD

Arrangements have been made for
D R MITCHELL
to attend
CHICHESTER CLINIC

at 10.45 on 27/ 9/63
for protection against:
POLIOMYELITIS DOSE 1

PARENT OR GUARDIAN OF

D R MITCHELL

63 GROSVENOR RD

CHICHESTER

SUSSEX

APPENDIX 8

The Appointment Lists - Prepared by the Computer

Two appointment lists are shown, one for a County Council clinic and one for a general practitioner.

Column 1. Serial numbering of patients due to attend the session.

Column 2. Appointment times at the rate of 28 every 15 minutes - a rapid rate which is now universally accepted by the doctors working these arrangements.

Column 3. Patients' names, grouped by type of service so that the physician is less than normally likely to give the wrong vaccination or immunisation.

Column 4. This figure identifies the procedure in relation to Schedule P (Appendix 1).

Column 5. An indication to the general practitioner of those procedures, a record of which carries an entitlement to the agreed fee of 5/- in each case. It should be noted that fees are paid only for the records of certain procedures and completed groups of procedures.

Column 6. The doctor makes a tick in one of the three columns "Satisfactory" if the patient attended and the service was given. "Did not attend" if the patient was absent without a known reason (three consecutive monthly indications of this kind attract a health visitor follow-up visit).

: THE COUNTY HEALTH DEPARTMENT
COUNTY HALL, CHICHESTER
SUSSEX Telephone: CHichester 3001

IMMUNISATION PROGRAMME
GP/CLINIC LIST

1FELPHAM INFANT WELFARE
WESTLOATS LANE
BOGNOR REGIS
SUSSEX

CLINIC No.	A20
DATE OF CLINIC	11 8/64

1	2	3	4	5	6			7	8	9
LINE No.	TIME OF APPOINTMENT	NAME	STAGE	PAYMT DUE	SATISFACT-ORY	DID NOT ATTEND	EXCUSE RECEIVED	BATCH No.	NOTES	LINE No.
		TRIPLE ANTIGEN								
1	2.00	S ASHDOWN	4							1
2	2.00	P W BENNETT	4							2
3	2.00	A GRIZZELLE	4							3
4	2.00	R P HAMMOND	4							4
5	2.00	M A DIPROSE	4							5
6	2.00	C L MCGREGOR	4							6
7	2.00	E MCCARTHY	1							7
8	2.00	G C KNIGHT	1							8
		DIPHTHERIA-TETANUS								
9	2.00	J G WOOD	1							9
10	2.00	J COOPER	5							10
11	2.00	J SUMMERS	1							11
12	2.00	W L STANDERWICK	1							12
13	2.00	I J WILLIAMS	1							13
14	2.00	A P GUMBLEY	1							14
15	2.00	F L GUTHRIE	1							15
16	2.00	J D HUNTINGDON	1							16
17	2.00	A J COLVIN	1							17
18	2.00	T M MARTIN	1							18
		SMALLPOX								
19	2.00	N D UPHILL	1		XX				A B C D	19
20	2.00	J FREEMAN	1		XX				A B C D	20

VACCINATION AND IMMUNISATION

1. A tick should be made under the appropriate heading in col. 6 to help in arranging future appointments.
2. If site of injection is other than Left Upper Arm please indicate site in col. 8.
3. Batch number of vaccine used must be entered in col. 7.
4. Please ring the appropriate letter for result of Smallpox Vaccination in col. 8 and note any complication or unusual reaction.

   A = Typical Primary Vaccinia (max. 7th-10th day) B = Accelerated Reaction (max. 5th-7th day).
   C = Local Reaction without vesiculation. D = No Local Reaction.

5. Please complete this form and return it together with any completed "Unscheduled Appointments Given" forms to the COUNTY HEALTH DEPARTMENT immediately treatment is completed or at the latest by:—

FOR OFFICE USE ONLY

"Excuse received" if the patient did not attend but an acceptable reason for non-attendance was known to the doctor.

Column 7. The doctor gives the batch number of the antigen used - once is usually sufficient - so that reactions may be related to an identifiable batch of antigen.

Column 8. is used for any useful comment (see Appendix 9) and for recording in the conventional way, the results of smallpox vaccination.

: THE COUNTY HEALTH DEPARTMENT
COUNTY HALL, CHICHESTER
SUSSEX Telephone: CHIchester 3001

IMMUNISATION PROGRAMME
GP/CLINIC LIST

PAGE No. 1

2DR P DENMAN
LANGLEY HOUSE
WEST ST
CHICHESTER

CLINIC No.	477
DATE OF CLINIC	4/ 8/64

1	2	3	4	5	6			7	8	9
NE o.	TIME OF APPOINTMENT	NAME	STAGE	PAYMT DUE	SATISFACT -ORY	DID NOT ATTEND	EXCUSE RECEIVED	BATCH No.	NOTES	LINE No.
		TRIPLE ANTIGEN						52304		
1	2.30	J COOKE	4	*	✓					1
2	2.30	C POOLE	4	*	✓					2
3	2.30	P J PASSINGHAM	4	*			✓		On holiday	3
4	2.30	S R PEARCE	4	*	✓					4
5	2.30	J SELLEK	4	*	✓					5
6	2.30	L J ROYLANCE	4	*	✓					6
7	2.30	A JAMESON	2		✓					7
8	2.30	R WHITE	2		✓					8
9	2.30	L M BONIFACE	1			✓				9
10	2.30	A L HARRISON	1		✓					10
11	2.30	R POUND	1		✓					11
12	2.30	S J ASHTON	1		✓					12
13	2.30	J ROWSON	2		✓					13
14	2.30	TYLER	1				✓		Child not well.	14
		DIPHTHERIA-TETANUS						15816		
15	2.30	M POE	1		✓					15
16	2.30	T G REYNOLDS	1			✓			Address now 6 Pepper Lane, Bognor.	16
17	2.30	J M ROMAN	5	*	✓					17
18	2.30	D A MATTHEWS	5	*	✓					18
19	2.30	A G MOORE	5	*	✓					19
20	2.30	M J CANNON	5	*	✓					20
21	2.30	C H PATTEN	5	*		✓			Not my patient	21
22	2.30	L J BLYTHMAN	5	*	✓					22

VACCINATION AND IMMUNISATION

1. A tick should be made under the appropriate heading in col. 6 to help in arranging future appointments.
2. If site of injection is other than Left Upper Arm please indicate site in col. 8.
3. Batch number of vaccine used must be entered in col. 7.
4. Please ring the appropriate letter for result of Smallpox Vaccination in col. 8 and note any complication or unusual reaction.
   A=Typical Primary Vaccinia (max. 7th-10th day) B=Accelerated Reaction (max. 5th-7th day).
   C=Local Reaction without vesiculation. D=No Local Reaction.
5. Please complete this form and return it together with any completed "Unscheduled Appointments Given" forms to the COUNTY HEALTH DEPARTMENT immediately treatment is completed or at the latest by:

APPENDIX 9

The Appointment List - Completed and Returned

This is an appointments list as it was returned by a family doctor after a vaccination and immunisation session.

It should be noted that the clerical effort required of the doctor is minimal but that the response at the session is very accurately detailed.

This information is now codified and punched for assimilation by the computer so as to complete the final stages of the operation - the preparation of statistics, printing cheques for the family doctors, the preparation of "repeated defaulters" lists, and the elaboration of an updated magnetic tape record which will be the basis of the following month's programming.

WEST SUSSEX COUNTY COUNCIL — AMBULANCE SERVICE — STATISTICS

FORM A.S.2.

STATION NUMBER

VEHICLE NO.	JOURNEY / DATE	TIME OF APPOINTMENT
35	2 / 1 / 1	

NAME

PICK – UP: O/S FARMERS P/H LANCING

OUT 01 • 50 HRS

SET DOWN: 52 (Southlands Hp)

IN 02 • 40 HRS

DRIVER: DAVIS

ATTENDANT: BROWN

EMERGENCY CASES ONLY ARRIVAL AND DEPARTURE TIMES

AT PLACE OF EMERGENCY

ARR 02 • 00 HRS

DEP 02 • 05 HRS

AT HOSPITAL

ARR 02 • 17 HRS

DEP 02 • 30 HRS

HOSPITAL NUMBER B — CASE C — CALL CODE D — E

ACCID
EMERG
OUTPAT
SINGLE
OUTPAT
RETURN
ADMIS
SION
DIS –
CHAR'G
HOSP
TRANS
MATER
– NITY
HOUSE/
HOUSE
INFECT
IOUS
DECEAS
– ED
ARR
– TIVE

WALK
SIT
STRET
CHER

STATION NUMBER B C D E

61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

21 22 23 25 26 27

50690 - 998 18M

APPENDIX 10

County Ambulance Service - Journey/Passenger Detail on a Mark-Sense Card

This is a "mark-sense" card as used in the County ambulance service. The cards, marked by the ambulance driver attendant in the appropriate code-column locations, are fed directly to the card-punch input of the data processing system to produce statistical information such as that displayed below.

STATION 09	
PATIENTS TRANSPORTED	2013
WALKING CASES	1117
SITTING CASES	470
STRETCHER CASES	422
ACCIDENTS/EMERGENCIES	76
OUTPATIENT-SINGLE JOURNEYS	550
OUTPATIENT-RETURN JOURNEYS	450
ADMISSIONS	208
DISCHARGES	88
HOSPITAL TRANSFERS	102
MATERNITY CASES	17
HOUSE TO HOUSE TRANSFERS	60
INFECTIOUS CASES	2
DECEASED PERSONS	6
ABORTIVE	71
CASE CODE OMITTED	3

TYPE OF DELIVERY

CODING INDEX

20. Single born without mention of immaturity.
21. Single born immature.
22. Twin without mention of immaturity - mate liveborn.
23. Twin without mention of immaturity - mate stillborn.
24. Twin immature with mate liveborn.
25. Twin immature with mate stillborn.

In addition these numbers should be supplemented by:-

0. Born in hospital.
1. Born before admission to hospital.
2. Born outside hospital and not hospitalised.

e.g. (i) Single child born at term at home and subsequently kept at home would be 202.

(ii) Premature twins born alive in hospital would be 240.

This report should on completion, be forwarded to the County Medical Officer of Health, County Hall, Chichester.

WEST SUSSEX COUNTY HEALTH DEPARTMENT Form No. 2036

RISK REGISTER

Name ..... Date of Birth..... Sex ..... Link No: .....

Address .....

Family doctor ..... If no defect or "risk factor" tick in box

Midwife ..... Health Visitor ..... 1st visit

Type of delivery (Enter No. of category from list over) Age 1 yr.

Age 2 yrs.

Age 5 yrs.

Section 1.	Code	Tick here	Card Col.
HEREDITARY			
Schizophrenia	30 07		
Other psychosis (specify)	30 9		
Mental subnormality	32 5		
Mongolism	32 54		
Cerebral palsy	35 1		
Other diseases of the brain	35 4		
Friedrich's ataxia	357		
Epilepsy	3533		
Squints	384		
Blindness	389		
Deafness	398		
Section 2.			
ANTE NATAL			
Essential hypertension	44 4		
Hyperemesis	642 4		
Toxaemia mild	642 21		
" moderate	642 22		
" severe	642 23		
Threatened abortion	648 0		
Hydramnios	648 3		
Ante partum haemorrhage	670		
Thyrotoxicosis (maternal)	252		
Diabetes (maternal)	769 1		
Rubella	769 2		
Illness)			
Accident) In first			
Operation) 16 weeks	769 4		
Anaesthetic)			
Other virus infection (specify)			
Medication (specify)			

Section 3.	Code	Tick here	Card Col.
PERINATAL			
Labour complicated	67 0		
" prolonged	67 5		
" precipitate	67 8		
Anoxia	76 2		
Rhesus incompatibilities	77 0		
Kernicterus	7701		
Prematurity	7740		
Postmaturity	7741		
Section 4.			
POST NATAL			
Meningitis	34 0		
Encephalitis	34 3		
Middle ear disease	39 1		
Congenital abnormalities (specify)	75 0		
Convulsions	76 0		
Cerebral irritation	76 1		
Neonatal jaundice	77 3		
Section 5.			
SYMPTOMATIC (specify)			

FOR OFFICE USE ONLY			REPORT FORM	
BRING FORWARD			Sent	Ret'd
4 months				
7 months				
1 year				
2 years				

M. 1760

APPENDIX 11

Risk Register Card

This is a "risk register" card which is completed for all neonates who have been subjected during pregnancy, parturition or the post-natal period to some adverse factor. It is also completed for infants who have some defect which will require special attention during childhood.

The code numbers used are those of the International List and it is hoped that the correlations of which the data processing system is capable may contribute to an elucidation of the (often multiple) causes of physical and mental abnormalities in infancy.

WEST SUSSEX COUNTY COUNCIL

SHS/DT/19

SCHOOL DENTAL SERVICE

Dental Officer No. .....

23

TREATMENT REPORT OF SCHOOL DENTAL OFFICER FOR WEEK ENDED .....19.....

1		4 6	7	8	9	10	11	12 13	14 15 16 17			18 19	20 21 22 23			24	25	26 27	28 29	30 31	32 33	34 35	36
								Permanent Teeth				Temporary Teeth											
									Fillings				Fillings										
Name of Patient	Code	Date	a.m. or p.m.	Code	Visit Code	Treatment Code	Treatment completed enter Code	No. of extractions	No. of teeth filled	No. of fillings	X-rays No. of films	No. of extractions	No. of teeth filled	No. of fillings	X-rays No. of films	Anaesthetics	If denture or appliance first fitted this year enter 1	Other operations Code	Other operations Code	Other operations Code	Other operations Code	Other operations Code	Age Groups
	Non ortho 1 Ortho 2 M & C W 3			Pupil 1 Mother 2 0-5 yrs 3	1st visit 1st course 1 1st vis. subs course 2 Repeat visit 3 Casual/special/ emergency 4 Failed appointment 5 M & C.W. only Examination 6	Continued 1 Discontinued 2 No treatment required } 3 Treatment commenced } 4	Ortho 1 Non-ortho } 2 Ortho & non-ortho } 3									1 Local 2 Gen'l M.O. 3 Gen'l D.O.							1 (5-9) 2 (10-14) 3 (15+)

OTHER OPERATIONS	CODES PERM. TEETH	CODES TEMP. TEETH
SILVER NITRATE	10	20
DRESSING	11	21
ROOT CANAL 1st	12	22
" " Subsequent	13	23
" " Last	14	24
CROWN JACKET—Preparation	15	
2nd	16	
STONING TEETH	17	27
SURGICAL EXTRACTION ...	18	
SCALING AND/OR GUM TREATMENT ...	19	29

DENTURES & ORTHODONTICS	CODES
IMPRESSION	30
BITE	31
TRY IN	32
ORTHODONTIC: FIT REG.PLATE FIXED APPLIANCE	33
ORTHODONTIC: FIT REG. PLATE REMOVEABLE APPLIANCE ...	34
DENTURES: FIT UPPER PARTIAL	35
DENTURES: FIT LOWER PARTIAL	36
DENTURES: FIT UPPER COMPLETE	37
DENTURES: FIT LOWER COMPLETE	38
EASE	39
ORTHO. REG. ADJUST	40
REPAIRS	41
INLAYS—Preparations	42
—Fitting	43
POLISHING FILLINGS	44
TEMP. CROWN FITTED	45
TEMP. CROWN REFITTED	46
	47
	48
	49
EXAMINATION &/OR ADVICE	50

.....

(Signed) DENTAL OFFICER

Mul.2003 (Rev.1-65)

WEST SUSSEX

SCHOOL D

Dental Officer No. .....

23

TREATMENT REPORT OF SCHOOL DENTAL OFFICE

Name of Patient	1 Code: Non ortho 1, Ortho 2, M & C W 3	4 6 Date	7 a.m. or p.m.	8 Code: Pupil 1, Mother 2, 0-5 yrs 3	9 Visit Code: 1st visit 1st course 1; 1st vis. subs course 2; Repeat visit 3; Casual/special/ emergency 4; Failed appointment 5; M & C.W. only Examination 6	10 Treatment Code: Continued 1; Discontinued 2; No treatment required 3; Treatment commenced 4	11 Treatment completed enter Code: Ortho 1; Non-ortho 2; Ortho & non-ortho 3	12 13 Permanent: No. of extractions	14 Fillings: No. of teeth filled	15 Fillings: No. of fillings

APPENDIX 12

Dental Officer's Work Return

This is a form which is completed by each dental officer for each week's work. In practice, his dental attendant will construct this record as the individual patients' records are brought up-to-date.

This information is processed by the computer to provide statistics for committees and ministries, and indicates trends and individual performance developments which assist the Chief Dental Officer in making good recommendations and decisions.

WEST SUSSEX COUNTY COUNCIL

MONTHLY RETURN OF HOME NURSES, MIDWIVES AND HOME NURSE/MIDWIVES

District _____

Nurse _____

Return for month _____

3

HOME NURSING			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	CARD COLS.	TOTAL
1. Medical	*1st visit																																	10	
	Revisits																																	13	
2. Surgical	*1st visit																																	16	
	Revisits	See note C																																19	
3. Others	*1st visit																																	22	
	Revisits																																	25	
4. No. of patients in 1, 2 and 3 above who were (a) aged 65 years or over in 1965 at (i) 1st visit																																		28	
(ii) Revisits																																		31	
(b) under 5 years of age at																																			

WEST SUSSEX COUNTY COUNCIL

MONTHLY RETURN OF HEALTH VISITOR/SCHOOL NURSE

District _____

Health Visitor _____

Return for month of _____

1

CASES VISITED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	CARD COL.	TOTAL
1. First visits to children born in 1965																																10	
2. Revisits " " " " "																																13	
3. Ineffectual visits " " " "																																16	
4. First visits to children born in 1964																																19	
5. Revisits " " " " "																																22	
6. Ineffectual visits " " " "																																25	
7. First visits to children born in 1960-63																																28	
8. Revisits " " " " "																																31	
9. Ineffectual visits " " " "																																34	
10. First visits to persons aged 65 or over																																37	
11. Revisits " " " " "																																40	
12. Number included in line 10 who were visited at the special request of a G. P. or hospital																																43	
13. First visits to mentally disordered persons																																46	
14. Number included in line 13 who were visited at the special request of a G. P. or hospital																																49	
15. First visits to persons discharged from hospital (other than mental hospitals)																																52	
16. Number included in line 15 who were visited at the special request of a G. P. or hospital																																55	
17. Number of tuberculous households visited *																																58	
18. Number of households visited on account of other infectious disease *																																61	

NOTE A: If a case is appropriate to more than one line it should be included in all appropriate lines.

***NOTE B**: In the case of tuberculous households, or other infectious diseases, households only should be counted.

2

SESSIONS ATTENDED		CARD COL.
19. MATERNAL & CHILD WELFARE	Child Welfare Centres-Doctor's sessions	10
	-H. V. 's sessions	13
	Ante-Natal Clinics	16
20. SCHOOL HEALTH	Medical inspections attended	19
	Pre-medical inspections attended	22
	School clinics attended	25
	No. of visits to schools	28
21. AGED	Clubs attended - Day	31
	- Evening	34
22. OTHERS -	Include Tuberculosis clinics, child guidance clinics etc.	37
23. HEALTH EDUCATION	Sessions attended - Ante-natal mothercraft and relaxation classes	40
	Mothers' Clubs	43
	Schools	46
	Youth Clubs	49
	Other	52
	Time spent on - preparation	55
	- talks	58

CASE LOADS		DECEMBER ONLY
Number of children	) Under 1 year	61
	) 1 - 5 years	64
Number of aged 65 years or over		67

APPENDIX 13

Nurse's Work Return

This is a monthly return of work done which is submitted by the home nurses, midwives and health visitors, some of whom are specialists and others combined workers.

Over two hundred of these returns are computer processed each month to provide information for committees, ministries, and departmental administrators.

A section of the computer "print out" is also shown.

HOME NURSING

1 MEDICAL	1ST VISIT		7135
	REVISITS		155758
2 SURGICAL	1ST VISIT		1575
	REVISITS		21053
3 OTHERS	1ST VISIT		876
	REVISITS		2748
4 NO OF PATIENTS 65 OR OVER	(A) 1ST VISIT		5536
	(B) REVISIT		135750
5 NO OF PATIENTS UNDER 5 AT	(A) 1ST VISIT		413
	(B) REVISIT		1474

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